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10/593,174	09/15/2006	Robert Donald Grapes	37261P121	8718

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EXAMINER
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BAYOU, AMENE SETEGNE

ART UNIT	PAPER NUMBER
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3746

MAIL DATE	DELIVERY MODE
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12/24/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,174	<b>Applicant(s)</b> GRAPES, ROBERT DONALD	
	<b>Examiner</b> AMENE S. BAYOU	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 1,2,6,8,15,18,19 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-5,7,9-14,16,17,20 and 22-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 22,3-5,7,9,16,17,20 are rejected under 35 U.S.C. 102(b) as being unpatentable over Polaschegg (4634430) in view of Eickmann (4904167).

3. In re claim 22, Polaschegg discloses a pumping system including:

- A **pump (figure 1)** ,including an **cavity (16,18)** with **opposing surfaces; inlet and outlet passages (24,26)** communicating with the cavity ;a **pressure port (32)** communicating with the cavity ;a **flexible membrane (40)** located within the cavity; wherein the flexible membrane (40) has a first stable state (**column 4 lines 20-30**) in contact with one of the opposing surfaces ,the first stable state corresponding to completion of an inlet stage of a pumping cycle; has a second stable state in contact with the other opposing surface, the second stable state corresponding to completion of an exhaust stage of the pumping cycle; and can be caused to invert from one stable state to the other stable state by application positive or negative pressure to the cavity via the pressure port (**column 4 lines 20-30; column 6,lines 34-65**). Polaschegg ,however fails to disclose the following limitation which is taught by Eickmann:
  - The **cavity (35,37)** is **elongate** and the **pressure port (1535)** is **offset** towards one end of the cavity, in figure 1

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4. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the diaphragm pump of Polaschegg by offsetting the location of the pressure port in relation to the membrane as taught by Eickmann in order to allow the buckling movement of the membrane to progress predominantly in one direction along the horizontal (X) axis and thus achieving smooth pumping operation. Also it would have been obvious to one skilled in the art at the time the invention was made to modify the diaphragm pump of Polaschegg by changing the shape of the cavity to an elongate one as taught by Eickmann in order to facilitate fluid due to the fact that the shape is aerodynamic.

5. In re claim 3, and 4 Polaschegg in view of Eickmann as applied to claim 22 discloses the claimed invention:

Polaschegg discloses:

- The membrane (40) is formed from an elastomeric sheet material, **(column 4, line 35-40)**.

6. In re claim 5, Polaschegg in view of Eickmann as applied to claim 22 discloses the claimed invention:

Polaschegg discloses:

- The membrane (40) is clamped between first and second sections of the housing (41 and 42 respectively) each housing section (41,42) of a housing, each housing section with one of the opposing surfaces having a cavity section such that when the housing sections (41,42) are assembled to form the housing, the cavity with opposing surfaces is formed, in figure 1.

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7. In re claim 7, Polaschegg in view of Eickmann as applied to claim 22 discloses the claimed invention:

Polaschegg discloses:

- A device (14) to cyclically apply the positive and negative pressures to the cavity via the pressure port to cause the membrane (40) to move between the stable states, in figure 1 and column 3, lines 44-49.

8. In re claim 9, Polaschegg in view of Eickmann as applied to claim 22 discloses the claimed invention:

Polaschegg discloses:

- The housing sections (41, 42) are joined together and to clamp the membrane (40) about a peripheral margin thereof, in figure 1 and column 4, lines 31-40.

9. In re claim 16, Polaschegg in view of Eickmann as applied to claim 22 discloses the claimed invention:

Polaschegg discloses:

- The cavity (cavity between 41, 42) is of curved cross-section, in figure 1.

10. In re claim 17, Polaschegg in view of Eickmann as applied to claim 16 discloses the claimed invention:

Polaschegg discloses:

- The ends of the elongate cavity (cavity between 41, 42) are complex curved, in figure 1.

11. In re claim 20, Polaschegg in view of Eickmann as applied to claim 7 discloses the claimed invention:

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Polaschegg discloses:

- The clamping of the membrane (40) creates further compressive forces in the membrane (inherently and also indicated in column 4, lines 20-30).

12. Claims 10,12,13 are rejected under 35 U.S.C 103(a) as being unpatentable over Polaschegg in view of Eickmann as applied to claim 5 further in view of Behringer et al. (5902096).

13. In re claim 10 Polaschegg in view of Eickmann discloses the claimed invention except the following limitation which is taught by Behringer et al.:

- The first housing section (41 or 42) includes a recess into which the membrane (40) is located, the peripheral dimensions of the membrane being greater than those of the recess whereby compressive forces are set up in the membrane when it is installed in the recess to thereby create the preset, in figure 1 and 2 and column 3, lines 30-50.

14. It would have been obvious to one skilled in the art at the time the invention was made to choose the proper tolerance for the housing of Polaschegg and Eickmann in to which the membrane is clamped as taught by Behringer et al in order to achieve the required degree of membrane compression (which is clearly indicated by Behringer et al). Please also note that Polaschegg even teaches that the membrane can be disposed already biased a certain amount in the housing (see column 4, lines 24-28).

15. In re claim 12, Polaschegg in view of Eickmann and Behringer et al. discloses the claimed invention:

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Behringer et al. disclose:

- A third housing section (50) coupled to the second housing section (30), third housing section including means for facilitating connection (57) of inlet (40) and outlet conduits (43) for pumpable material. It would have been obvious to one skilled in the art at the time the invention was made to add a third housing part as taught by Behringer et al in order to separately manufacture elements of the pumping system and easily assemble them at final installation.

16. In re claim 13, Polaschegg in view of Eickmann and Behringer et al. as applied to claim 12 discloses the claimed invention:

Behringer et al. disclose:

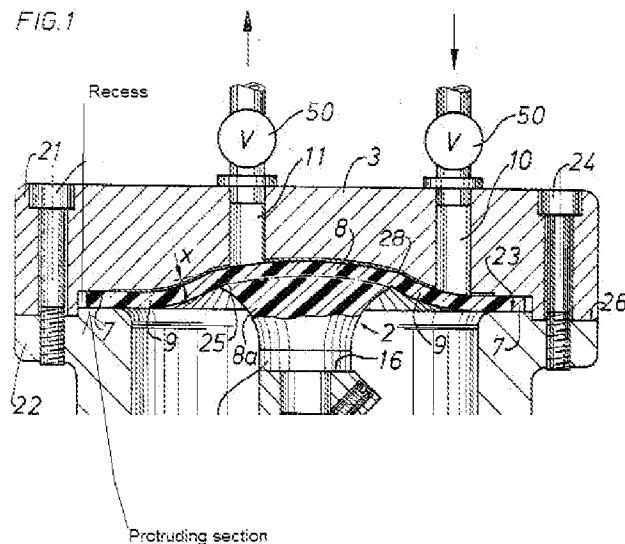
- A pump (1), in figure 1, wherein the second (30) and third housing (50) sections include inlet (40, 41) and outlet openings (42, 43) and means for locating therein a valve (35).

17. Claim 11 is rejected under 35 U.S.C 103(a) as being unpatentable over Polaschegg in view of Eickmann as applied to claim 5 further in view of Becker (3947156).

18. In re claim 11, Polaschegg disclosed the claimed invention including:

- The second housing section (41 or 42) which engages in the recess when the first and second housing sections are combined together, to cause the membrane (40) to be clamped in place, in figure 1. and 2. Polaschegg, in view of Eickmann, However fails to disclose the following limitation which is taught by Becker:

- The second housing section (k) includes a protruding portion (as shown below), in figure 1.



19. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the diaphragm pump of Polaschegg and Eickmann by making protrusion in the second housing section as taught by Becker in order to have better clamping capability.

20. Claim 14 is rejected under 35 U.S.C 103(a) as being unpatentable over Polaschegg in view of Eickmann and Behringer et al as applied to claim 13 further in view of Dilworth (3900276).

21. In re claim 14, Polaschegg in view of Eickmann and Behringer et al disclosed the claimed invention except the following limitation which is taught by Dilworth:

- A pump (10) wherein the valve element (74) is a disk of flexible material, in figure 1 and column 5, lines 6-7.



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22. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the diaphragm pump of Polaschegg , Eickmann and Behringer et al by selecting a flexible disc valve as taught by Becker in order to move the valve easily during opening and closing or merely as an obvious design choice.

23. Claims 22-24,26-28 are rejected under 35 U.S.C 103(a) as being unpatentable over Polaschegg in view of Perlov (4915017).

24. In re claim 22, Polaschegg discloses a pumping system including:

- A **pump (figure 1)** ,including an **cavity (16,18)** with **opposing surfaces; inlet and outlet passages (24,26)** communicating with the cavity ;a **pressure port (32)** connected to the cavity ;a **flexible membrane (40)** located within the cavity; wherein the flexible membrane (40) has a first stable state (**column 4 lines 20-30**) in contact with one of the opposing surfaces ,the first stable state corresponding to completion of an inlet stage of a pumping cycle; has a second stable state in contact with the other opposing surface, the second stable state corresponding to completion of an exhaust stage of the pumping cycle; and can be caused to invert from one stable state to the other stable state by application positive or negative pressure to the cavity via the pressure port (**column 4 lines 20-30; column 6,lines 34-65**). Polaschegg,however fails to disclose the following limitation which is taught by Perlov:
  - **Recessed flow paths (26,26',166';figures 3,18;column 8,lines 52-57)** are formed in the opposing surfaces such that fluid can flow along each surface

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even when the flexible membrane is in contact with the surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the diaphragm pump of Polaschegg by including recesses in the housing portions as taught by Perlov in order to prevent sticking of the membrane to surfaces and thereby facilitate easy pumping.

25. In re claim 24, Polaschegg in view of Perlov as applied to claim 23 discloses the claimed invention:

Polaschegg discloses:

- The housing sections (41, 42) are joined together and to clamp the membrane (40) about a peripheral margin thereof, in figure 1 and column 4, lines 31-40.

26. In re claim 26, Polaschegg in view of Perlov as applied to claim 23 discloses the claimed invention:

Polaschegg discloses:

- The cavity (cavity between 41, 42) is of curved cross-section, in figure 1.

27. In re claim 27, Polaschegg in view of Perlov as applied to claim 23 discloses the claimed invention:

Polaschegg discloses:

- The ends of the elongate cavity (cavity between 41, 42) are complex curved, in figure 1.

28. In re claim 28, Polaschegg in view of Perlov as applied to claim 23 discloses the claimed invention:

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Perlov discloses:

- The recessed flow paths **(26,26',166';figures 3,18;column 8,lines 52-57)** include one or more grooves formed in the opposing surfaces.

29. Claim 25 is rejected under 35 U.S.C 103(a) as being unpatentable over Polaschegg in view of Perlov as applied to claim 23 further in view of Eickmann.

30. In re claim 25 Polaschegg in view of Perlov disclose the claimed invention except the following limitation which is taught by Eickmann:

- The **pressure port (1535)** is offset in the length of the cavity. See claim 22 for obviousness

### ***Response to Arguments***

31. Applicant's arguments with respect to claims 3-21 have been considered but are not persuasive.

32. Applicant canceled claim 21 and introduced new claims 22 and 23 while retaining most of the features of claim 15 and also adding new features. Applicant on page 3 paragraphs 4 and 5 argued that Eickmann does not disclose an elongate member.

Finally on page 4 paragraph 2 applicant argued that Eickmann's metal membrane is not suitable to be combined with that of Polaschegg's. Examiner respectfully disagrees.

As clearly discussed in this office action just by looking at figure 1 of Eickmann alone one skilled in the art would appreciate that the cavity is elongate in axial direction. A standard English dictionary defines the word "elongate" as extended, lengthened long and thinner. The chamber has longer dimension in the horizontal direction as compared to the vertical direction. Finally in regards to applicant's argument of Eickmann's metal

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membrane is not suitable to be combined with that of Polaschegg's please note that no where in this or the previous office action does the examiner state that the Eickmann's membrane would be used to modify the pump of Polaschegg. Instead Eickmann is used only as a supporting reference for its teaching of an elongate cavity and an offset pressure port.

### ***Conclusion***

33. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amene S. Bayou whose telephone number is 571-270-3214. The examiner can normally be reached on Monday-Thursday, 9:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number

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for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
Unit 3746